



The future direction of post-transcatheter aortic valve replacement reinterventions: insights from the Transcatheter Valve Therapy Registry

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There is no right or wrong, only decisions and consequences. Such is the current state of lifetime management in aortic valve disease. After years of articles and panels discussing the long-term implications of transcatheter aortic valve replacement (TAVR), the consequences of our initial strategic choices are becoming clear in the real world. TAVR explant has become the fastest-growing cardiac surgical procedure in the United States, with a growth rate of almost 6,000% over the period from 2012 to 2023 (1). Redo-TAVR has also gained increasing relevance as a primary option in patients with failed TAVR valves (2). Nonetheless, several issues remain with regard to patient-prosthesis mismatch, coronary management and leaflet modification. This has all occurred in the context of a meteoric rise in TAVR among young patients, which is now performed in almost half of patients under the age of 60 years, in some experiences (3). Throughout the years, our understanding of native TAVR and options for post-TAVR reintervention has been significantly supported through national registry data such as the Society of Thoracic Surgeons (STS)/American College of Cardiology Transcatheter Valve Therapy (TVT) Registry. These data will remain vitally important in the future.

Several publications from the TVT Registry have confirmed the positive aspects of TAVR strategies, however, there remain some warnings regarding the use of TAVR as

the primary lifetime strategy in all patients. Over the years, the database has repeatedly shown favorable outcomes for TAVR in terms of operative mortality, length of stay, and access issues, with significant improvements seen over the early years of the procedure (4). Nonetheless, rates of stroke and permanent pacemaker implantation remain frustratingly steady in recent years, and a recent TVT report did highlight a small, but significant trend toward higher adjusted mortality between 2019 and 2024 [odds ratio (OR) =1.05 per year; 95% confidence interval (CI): 1.02–1.08], despite the move toward low-risk populations (4,5).

In addition to native TAVR research, the TVT database has given us valuable insights into post-TAVR reintervention strategies. Results for repeat TAVR have been highlighted in several publications (6,7). Some experiences have suggested that outcomes for repeat TAVR are comparable to native TAVR with no significant impact of the timing of repeat TAVR or the device platform used. The database has also contributed to our understanding of candidacy for these procedures. Herrmann *et al.* performed an analysis of over 62,000 patients that showed severe patient-prosthesis mismatch was present in up to 12% of TAVR patients, who would thus be ineligible for future repeat TAVR (8). Finally, issues around coronary access and increasing experience with leaflet modification remain a significant obstacle for the broad application of repeat

TAVR. It seems clear that repeat TAVR is an excellent option in properly selected patients, however there will continue to be a growing volume of patients who will need to be served by open surgery.

Our understanding of TAVR explant has also been bolstered through national registry data. In a state-wide analysis, Fukuhara *et al.* found a TAVR explant rate of 0.4% from 2012 to 2019, and became one of the first groups to describe the elevated rates of operative mortality and concomitant root surgery with these procedures (9). These trends have been echoed in several other studies and efforts have been made to share and standardize surgical techniques. Despite the high rate of 30-day mortality after TAVR explant, the long-term outcomes appear favorable after landmark analysis when compared to repeat TAVR (10).

Direct comparison of these two strategies remains challenging, as patient-specific comorbidities and anatomic factors play a major role. Nonetheless, we should remain cautious of considering repeat TAVR as a blanket approach, especially in light of a 1-year mortality of 17%, as shown in the recent TVT analysis, including 1,320 cases (6). Over a similar time frame, the STS experience documented a much higher volume of almost 3,000 explants. Close follow-up of these registries will be required to examine outcomes of both techniques as surgical expertise grows and patient risk profiles improve in the low-risk era.

As decisions surrounding lifetime management of aortic valve disease become increasingly prevalent and complex, we must remain steadfast in our commitment to studying these outcomes. Much has been written regarding post-TAVR reintervention, but real-world data remains scarce. Ultimately, our theoretical discussions about procedure selections and treatment pathways must be backed-up by evidence, and registry data gives us the best chance to collect a national snapshot of these outcomes. We believe that close study of these registries over the next decade is likely to have a significant impact on how we view procedural decisions in the future.

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Footnote

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